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IS : 9316 (Part 3) - 1987

Indian Standard

METHODS OF TEST FOR RUBBER LATEX

PART 3 DETERMINATION OF COAGULUM CONTENT (SIEVE RESIDUE)

[RL : 3]

(First Revision)

UDC 678·4·031 : 543 : 678·032·1

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NEW DELHI 110002

Gr 3 *October* **1987**

AMENDMENT NO. 1 MARCH 2002
TO
IS 9316 (PART 3) : 1987 METHODS OF TEST FOR RUBBER LATEX

PART 3 DETERMINATION OF COAGULUM CONTENT (SIEVE RESIDUE)

[RL:3]

(First Revision)

(*Page* 6, *clause* 3.1, *line* 2) — Insert 'or 80 mesh sieve' *after* '(180 micron IS Sieve)'.

(*Page* 6, *clause* 5.1, *line* 1) — Substitute 'latex' *for* 'laboratory'.

(PCD 14)

Reprography Unit, BIS, New Delhi, India

IS : 9316 (Part 3) - 1987

Indian Standard

METHODS OF TEST FOR RUBBER LATEX

PART 3 DETERMINATION OF COAGULUM CONTENT (SIEVE RESIDUE)

[RL : 3]

(First Revision)

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(*Continued on page* 10)

Indian Standard

METHODS OF TEST FOR RUBBER LATEX

PART 3 DETERMINATION OF COAGULUM CONTENT (SIEVE RESIDUE)

[RL : 3]

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part 3) (First Revision) was adopted by the Indian Standards Institution on 27 February 1987, after the draft finalized by the Rubber Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 Test methods for rubber latex had been originally covered in the following Indian Standards:

a) *For Natural Rubber Latex*

IS : 3708 (Part 1)-1966*

IS : 3708 (Part 2)-1968†

b) *For Styrene Butadiene Rubber Latex*

IS : 4511 (Part 1)-1967‡

Since some of the test methods covered in above standards were common, the concerned committee had decided some years ago to unify and publish a separate series of methods of test which would be applicable to all types of latices — natural as well as synthetic.

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*Methods of test for natural rubber latex: Part 1 Dry rubber content, sludge content, density, total alkalinity, KOH-number, mechanical stability, volatile fatty acid number, *p*H, total nitrogen, total copper, total iron, total manganese and total ash.

†Methods of test for natural rubber latex: Part 2.

‡Methods of tests for styrene-butadiene rubber (SBR) latices: Part 1 Determination of dry polymer, *p*H, density, residual styrene, bound styrene and soap content.

Accordingly, the following six test methods had been covered under IS : 9316:

IS : 9316 Methods of test for rubber latex:

- Part 1-1979 Determination of surface tension
- Part 2-1979 Determination of viscosity
- Part 3-1979 Determination of coagulum content
- Part 4-1979 Determination of total solids content
- Part 5-1979 Drawing of samples
- Part 6-1982 Determination of *p*H

0.2.1 As a result of further rethinking on the subject, it has now been decided to re-designate the test methods common to natural and synthetic rubber latices as RL series; test methods for natural rubber latex as NRL series and test methods for styrene-butadiene rubber latex as SBRL series. Consequently, test methods for rubber latex have been rationalized into the following three series:

a) IS : 9316 Unified methods of test applicable to both natural and synthetic rubber latices — RL series;

b) IS : 3708 Methods of test applicable to natural rubber latex — NRL series; and

c) IS : 4511 Methods of test applicable to styrene-butadiene rubber latex — SBRL series.

0.3 The existing Indian Standards under IS : 3708 (Parts 1* and 2†) IS : 4511 (Part 1‡) and IS : 9316 (Parts 1 to 6) are being gradually replaced by separate standards under the above three series, designated by the appropriate NRL, SBRL, or RL series, respectively.

0.3.1 The methods covered under NRL: 13, NRL: 14 and NRL: 15 of IS : 3708 (Part 1)-1966* are now being covered under the RL series in IS : 9316 (*under revision*).

0.4 In order to facilitate cross-reference, it has been decided to retain the original discrete NRL, SBRL and RL series numbers assigned to various test methods, in IS : 3708 (Parts 1* and 2†), IS : 4511 (Part 1‡)

---

*Methods of test for natural rubber latex: Part 1 Dry rubber content, sludge content, density, total alkalinity, KOH-number, mechanical stability, volatile fatty acid number, *p*H, total nitrogen, total copper, total iron, total manganese and total ash.

†Methods of test for natural rubber latex: Part 2.

‡Methods of test for styrene butadiene rubber (SBR) latices: Part 1 Determination of dry polymer, *p*H, density, residual styrene, bound styrene and soap content.

and IS : 9316 (Parts 1 to 6) in the revised Parts of IS : 3708, and IS : 4511 and IS : 9316 respectively.

0.4.1 For proper referencing of the existing test methods and the new methods under revision, a statement showing corresponding methods is given in Appendix A.

0.5 Since the concept of definition of coagulum content at international level have been undergone a change, the term 'sieve residue' in the title of this revision has been added.

0.6 In preparing the above series, the need to align the test methods with the corresponding ISO Standards/DIS/DP wherever available has also been taken into account for updating the test methods. In the preparation of this standard, assistance has been derived from ISO 706-1985 Rubber latex — Determination of coagulum content (sieve residue), issued by International Organization for Standardization (ISO).

0.7 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard (Part 3) prescribes a method for the determination of the coagulum content (sieve residue) of natural rubber latex concentrate containing preservative agents and also for the determination of the coagulum content (sieve residue) of synthetic rubber latices.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

2.1 Coagulum; Sieve Residue — The material, comprising pieces of coagulated rubber, latex skin and coarse foreign matter, retained under the conditions of the test on a stainless steel wire cloth with an average aperture width of 180 ± 10 µm.

---

*Rules for rounding off numerical values (*revised*).

3. APPARATUS

3.1 Test Filter — consisting of a disc of stainless steel wire cloth with an average aperture width of 180 ± 10 µm (180 micron IS Sieve) [*see* IS : 460 (Part 1)-1978*].

3.2 Two Stainless Steel Rings — of equal internal diameter between 25 and 50 mm.

3.3 Oven — capable of being controlled at 105 ± 2°C.

3.4 Desiccator

3.5 Beaker — of capacity 600-ml which has a lip.

4. REAGENTS

4.1 Potassium Oleate or Ammonium Laurate — surfactant solution 5 percent (*m*/*m*), of *p*H 10 (for use with natural rubber latices).

4.2 Water Soluble Ethoxylated Alkyl Phenol — surfactant solution 5 percent (*m*/*m*) (for use with synthetic rubber latices).

4.3 Litmus Paper

5. PROCEDURE

5.1 Weigh 200 ± 1 g of the laboratory sample into the beaker. Add 200 ml of the appropriate surfactant solution and mix thoroughly. Dry the test filter to constant mass in the oven, controlled at 105 ± 2°C and weigh to the nearest milligram. Record the mass (m_1). Firmly clamp the test filter between the stainless steel rings.

NOTE — If the wire cloth is not clean, immerse it for 2 min in boiling nitric acid (density 1·42 g/ml) and wash it with water before drying it to constant mass and weighing.

5.2 Wet the test filter with the same surfactant solution and pour the latex-surfactant mixture into the test filter. Wash the residue on the wire cloth with the same surfactant solution until it is free from latex. With natural rubber latex concentrate, wash with water until the washings are neutral to litmus. With synthetic rubber latex, wash with 200 ml of water. Carefully remove the wire cloth containing the wet coagulum from the clamp and swab the underside with filter paper.

---

*Specification for wire cloth test sieves (*second revision*).

5.3 Heat the wire cloth and coagulum for 30 min in the oven, controlled at 105 ± 2°C, allow to cool in the desiccator and weigh. Return to the oven at 105 ± 2°C for a further period of 15 min, allow to cool and re-weigh. Repeat the drying for 15 min periods until the loss in mass between successive weighings is less than 1 mg.

6. CALCULATION

6.1 The coagulum content, expressed as a percentage by mass of the latex, is given in the following formula:

$$\frac{m_2 - m_1}{m_0} \times 100$$

where

m_0 = mass, in grams, of the test portion;

m_1 = mass, in grams, of the wire cloth; and

m_2 = mass, in grams, of the wire cloth plus the dried coagulum.

6.2 If the results of duplicate determination do not agree to within 0·01 percent (*m*/*m*), carry out two further determinations.

APPENDIX A

(*Clause* 0.4.1)

TABLE SHOWING CORRESPONDENCE OF THE VARIOUS METHODS OF TEST COVERED IN THE EXISTING IS : 9316 (PARTS 1 TO 5)-1979, IS : 9316 (PART 6)-1982, IS : 3708 (PART 1)-1966, IS : 3708 (PART 2)-1968, IS : 4511 (PART 1)-1967 *WITH* THE REVISION/PROPOSED REVISION OF IS : 9316, IS : 3708 AND IS : 4511

Existing Test Methods			Proposed Revisions		Remarks
Test Method	IS No.	Part (Series)	IS No.	Series	
(1)	(2)	(3)	(4)	(5)	(6)
RL Series					
Determination of surface tension	IS : 9316-1979	Part 1	IS : 9316	Part 1 (RL : 1)	
Determination of viscosity	IS : 9316-1979	Part 2	IS : 9316	Part 2 (RL : 2)	
Determination of coagulum content	IS : 9316-1979	Part 3	IS : 9316	Part 3 (RL : 3)	
Determination of total solids content	IS : 9316-1979	Part 4	IS : 9316	Part 4 (RL : 4)	Under revision
Drawing of samples	IS : 9316-1979	Part 5	IS : 9316	Part 5 (RL : 5)	
Determination of *p*H	IS : 9316-1982	Part 6	IS : 9316	Part 6 (RL : 6)	
Determination of total copper	IS : 3708-1966	Part 1 (NRL : 13)	IS : 9316	Part 7 (RL : 7)	
Determination of total iron	IS : 3708-1966	Part 1 (NRL : 14)	IS : 9316	Part 8 (RL : 8)	
Determination of total manganese	IS : 3708-1966	Part 1 (NRL : 15)	IS : 9316	Part 9 (RL : 9)	
NRL Series					
Determination of dry rubber content	IS : 3708-1966	Part 1 (NRL : 1)	IS : 3708-1985 Part 1 (NRL : 1)		
Determination of sludge content	IS : 3708-1966	Part 1 (NRL : 5)	IS : 3708-1985 Part 2 (NRL : 5)		
Determination of density	IS : 3708-1966	Part 1 (NRL : 6)	IS : 3708-1985 Part 3 (NRL : 6)		
Determination of total alkalinity	IS : 3708-1966	Part 1 (NRL : 7)	IS : 3708-1985 Part 4 (NRL : 7)		

Determination of KOH-number	IS : 3708-1966	Part 1 (NRL : 8)	IS : 3708-1985	Part 5 (NRL : 8)
Determination of mechanical stability	IS : 3708-1966	Part 1 (NRL : 9)	IS : 3708-1985	Part 6 (NRL : 9)
Determination of volatile fatty acid number	IS : 3708-1966	Part 1 (NRL : 10)	IS : 3708-1986	Part 7 (NRL : 10)
Determination of total nitrogen	IS : 3708-1966	Part 1 (NRL : 12)	IS : 3708	Part 8 (NRL : 12)
Determination of total ash	IS : 3708-1966	Part 1 (NRL : 16)	IS : 3708-1986	Part 9 (NRL : 16)
Determination of boric acid	IS : 3708-1968	Part 2 (NRL : 17)	IS : 3708-1986	Part 10 (NRL : 17)
Determination of magnesium	IS : 3708-1968	Part 2 (NRL : 18)	IS : 3708-1986	Part 11 (NRL : 18)
SBRL Series				
Determination of dry polymer	IS : 4511-1967	Part 1 (SBRL : 1)	IS : 4511-1986	Part 1 (SBRL : 1)
Determination of density	IS : 4511-1967	Part 1 (SBRL : 6)	IS : 4511-1986	Part 2 (SBRL : 6)
Determination of volatile unsaturates	IS : 4511-1967	Part 1 (SBRL : 8)	IS : 4511	Part 3 (SBRL : 8)
Determination of bound styrene	IS : 4511-1967	Part 1 (SBRL : 9)	IS : 4511	Part 4 (SBRL : 9)
Determination of soap content	IS : 4511-1967	Part 1 (SBRL : 10)	IS : 4511	Part 5 (SBRL : 10)
Determination of high-speed mechanical stability	—	—	IS : 4511	Part 6 (SBRL : 11)

(*Continued from page* 2)

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